SKILLSHEET 8.1

Finding values of *n* and *r* in financial formulas

The formula for compound interest is given by:

$$A = P\left(1 + \frac{r}{100}\right)^n$$

where A = final amount accumulated at the end of n compounding periods ($)
P = principal invested (or borrowed) at the beginning ($)
r = rate of interest *per period* (not necessarily per annum) (%)
n = number of compounded periods.

Remember:
12 months = 1 year
6 months = semi-annual
365 days = 1 (normal) year
3 months = a quarter of a year
52 weeks = 1 year
366 days = 1 (leap) year

WORKED EXAMPLE

Find the value of *n* and *r* given the rate 12% per annum (p.a.) and the invested principal is compounded:
a semi-annually
b quarterly
c monthly
d daily (365 days).
Where appropriate, express your answer correct to 4 decimal places.

THINK **WRITE**

To work out the answers to r in the formula the rate must be adjusted according to the value of n.

a	Semi-annually	$n = 2$	**a** $r = \frac{12\%}{2} = 6\%$ every half year
b	Quarterly	$n = 4$	**b** $r = \frac{12\%}{4} = 3\%$ every quarter year (3 months)
c	Monthly	$n = 12$	**c** $r = \frac{12\%}{12} = 1\%$ every month
d	Daily	$n = 365$	**d** $r = \frac{12\%}{365} = 0.0329\%$ every day

Try these

For each of the following, express your answers correct to 4 decimal places where appropriate.

1 Find the value of n and r given the rate 3% p.a. and the invested principal is compounded:
a semi-annually **b** quarterly **c** monthly **d** daily (365 days).

2 Find the value of n and r given the rate 6% p.a. and the invested principal is compounded:
a semi-annually **b** quarterly **c** monthly **d** daily (365 days).

3 Find the value of n and r given the rate 2.5% p.a. and the invested principal is compounded:
a semi-annually **b** quarterly **c** monthly **d** daily (365 days).

4 Find the value of n and r given the rate 1.25% p.a. and the invested principal is compounded:
a semi-annually **b** quarterly **c** monthly **d** daily (366 days).

SKILLSHEET — ANSWERS

SKILLSHEET 8.1

Finding values of *n* and *r* in financial formulas

1 a $n = 2, r = 1.5\%$

b $n = 4, r = 0.75\%$

c $n = 12, r = 0.25\%$

d $n = 365, r = \frac{3}{365}\% \approx 0.0082\%$

2 a $n = 2, r = 3\%$

b $n = 4, r = 1.5\%$

c $n = 12, r = 0.5\%$

d $n = 365, r = \frac{6}{325}\% \approx 0.0164\%$

3 a $n = 2, r = 1.25\%$

b $n = 4, r = 0.625\%$

c $n = 12, r = \frac{2.5}{12}\% \approx 0.2083\%$

d $n = 365, r = \frac{2.5}{365}\% \approx 0.0068\%$

4 a $n = 2, r = 0.625\%$

b $n = 4, r = 0.3125\%$

c $n = 12, r = \frac{1.25}{12}\% \approx 0.104$

d $n = 365, r = \frac{1.25}{366}\% \approx 0.0034\%$